Sage-9681
by 038

Monthly Progress Letter No. 3

Contract No. A-101

System 4

1 August 1956 to 1 September 1956

CMCC Document No. 163X5.13

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including this title sheet.)

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1-0. GENERAL.

1-1. During the interval covered by this progress letter, basic antenna designs have been evaluated, basic receiving circuits have been breadboarded and tested, and a System 4 installation plan has been formulated. These, and associated advances, are described in the following paragraphs.

2-0. ANTENNAS.

2-1. Basic antenna design was described in Progress Letter No. 2 (CMCC 163X5.8). All basic antenna designs have been evaluated and are considered generally acceptable although possibly subject

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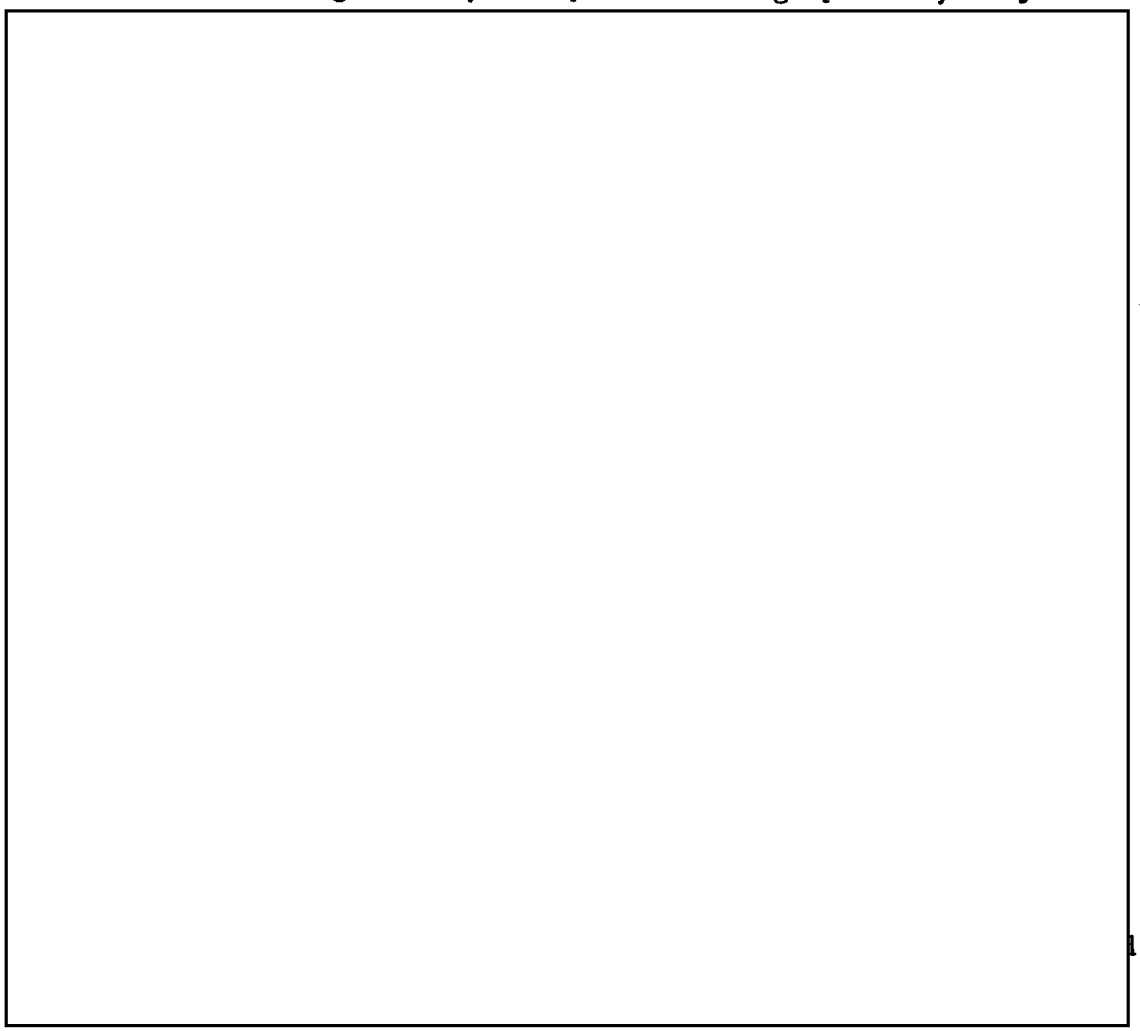

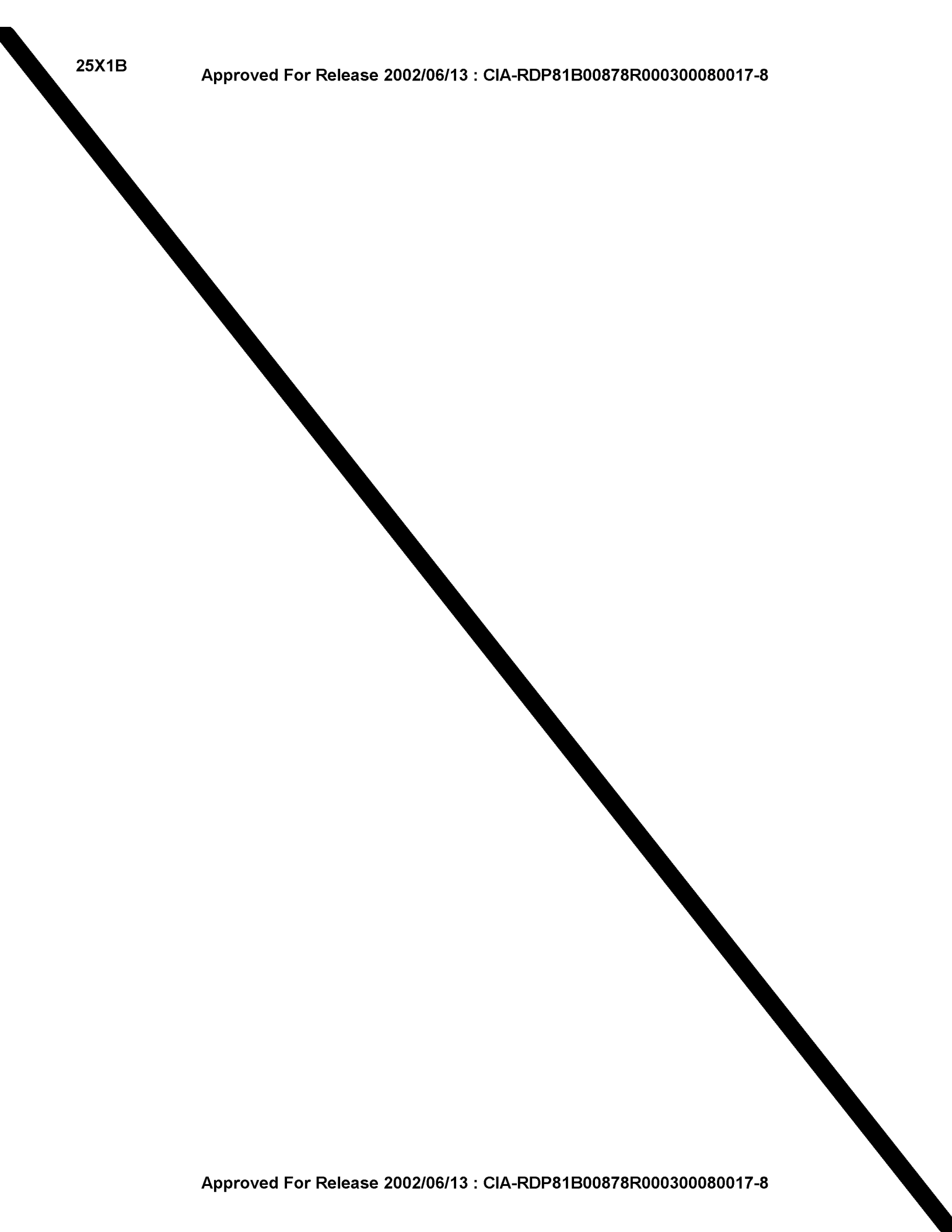

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A complete unit has been breadboarded and essentially meets the linear dynamic range and bandwidth specification. The performance of the breadboard is not yet satisfactory with respect to meeting recovery requirements.

4-0. FREQUENCY LOCK-OUT PROVISIONS.

4-1. Frequency lock-out will be provided for receiving channels I through VII to permit the receiver to be disabled over any preset, continuous segment of the frequency range covered by a particular receiver. The actual function will probably be effected by the action of a cam associated with a particular receiver tuning shaft. The amount of frequency lock-out will be solely a function of the cam configuration established as a preflight maintenance adjustment. The cam will actuate appropriately disposed mechanical switches which, in turn, will provide a disabling function for the respective receiver.

5-0. VIDEO PROGRAMMING.

5-1. Breadboarding of the basic logical elements to be contained within the video programming unit is continuing. During the interval covered by this letter, several minor flaws in logic were discovered. These were rectified by a thorough review, and the conclusion was reached that the basic logic was still reasonably efficient and sound.

6-0. CAMERA INDICATOR EQUIPMENT.

6-1. Initial breadboarding of the indicator circuits did not perform satisfactorily. After revision of the basic design approach, improved results were obtained. This revised design is now about 50 percent complete.

6-2. Camera specifications have been submitted to a supplier, and as of now, it appears that a unit closely meeting the specifications

can be obtained. However, there is a possibility that the original frame-indexing time, established as 40 milliseconds, might not be met and that minor changes in the programming equipment logic may be necessary to properly utilize the camera supplied. In addition, there is a probability that the camera will not be supplied with the full magazine capacity desired for the first flyable model. However, steps have been taken to insure that a magazine capability of at least half of that ultimately desired is made available.

7-0. AUDIO PROGRAMMING.

7-1. Attempts are being made to find suitable commutators for the time multiplex functions required for AGC recording and frequency-of-operation recording. Satisfactory switches have not yet been found and it may be necessary to resort to a frequency multiplex scheme to accommodate AGC recording and electrical time multiplexing in frequency-of-operation recording.

7-2. As indicated in monthly Progress Letter No. 2, the modulation units associated with the six receiving equipments for channels VIII through X were to be physically associated with the audio programming equipment, and units developed for similar functions in the receiving equipment of channels I through VII were to be used to the greatest extent practical. However, in the interest of accommodating the requirements of systems other than System 4, these units will be transistorized to the greatest possible degree.

7-3. Only a small amount of design effort will be required to effect recordings derived from channels I through X, since receiver output levels will be more than sufficient to drive the recording heads.

8-0. INSTALLATION PLANNING.

8-1. Each of the receiving equipments of channels I through VII will be a complete functional equipment requiring only an input signal from the respective antenna and delivering all outputs required by other System equipments. The basic power supplies for these receivers, however, will be located together in a separate package. Other major equipment packages will be the tape transport, the camera-indicator equipment, the video programming equipment, and the audio programming equipment.

8-2. Present planning calls for module structures designed for easy removal so as to facilitate servicing and maintenance. In a complete System configuration, all of the modules will be mounted and interconnected on the frame. All of the antennas will be affixed to the bottom of this frame. This assembly will be installed in the aircraft by means of a hoist and dolly arrangement. The equipment on the dolly will be placed under the equipment bay after the lower hatch cover has been removed. The equipment will then be lifted off the dolly and into position through hoist action from the upper hatch. Suitable means will be provided to secure the frame to the bay, and the hatch covers may be re-installed after appropriate electrical connections have been made to the sources of primary power.

8-3. The airframe structure will be called on to support only the basic frame structure of the System 4 equipment and will not directly support any of the individual system components. The lower hatch cover must be modified to provide radio transparency to the antennas. This modification will be undertaken by the aircraft manufacturer. However, evaluation of suitable radome materials for this purpose will be undertaken.

9-0. PLANNING.

9-1. During the next reporting interval the major effort will be directed toward:

a. continuing design improvements in the spiral and horn antennas

b. evaluating suitable radome material

c. designing and evaluating the front end of the channel IB receiver, including the new distributed amplifier

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[redacted]

f. continuing fabrication of gear-trains for other receiving channels

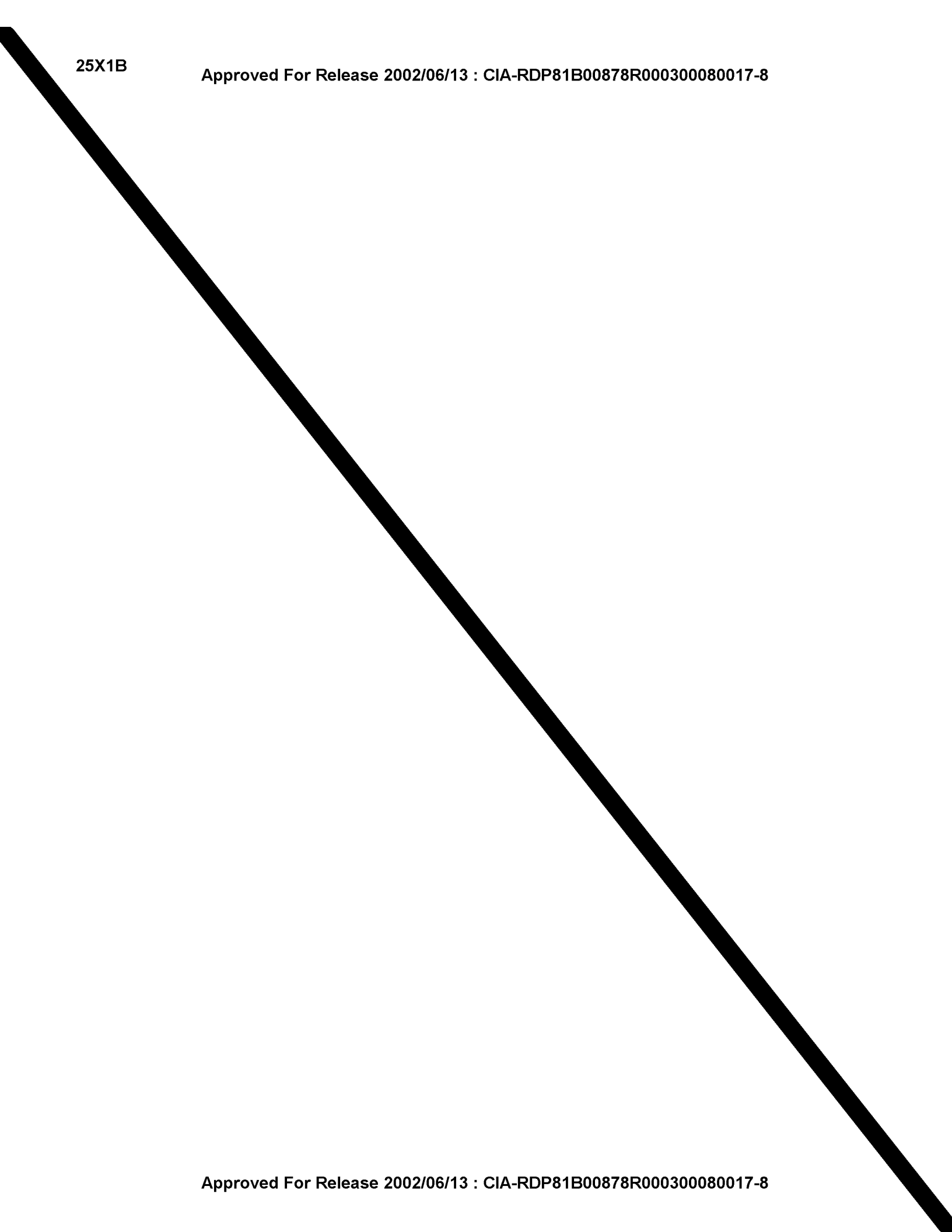
g. continuing design and fabrication of the basic tape transport breadboard

h. completing the transistorized video preamplifier design for channels VIII through X and initiating the design of transistorized demodulator units for these channels

i. continuing indicator design

j. consolidating camera design specifications and initiating purchase of the camera

k. completing a sufficient amount of breadboarding of the video programming equipment to prove out the basic logic.



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